

NOTES ON CYSTEODEMUS IN SOUTHERN NEVADA
(Coleoptera: Meloidæ)

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I had occasion, during the summer of 1937, to meet *Cysteodemus armatus* several times in the field, and found many of her activities to be of interest.

Strictly a desert animal, this rather large beetle is a familiar sight during the hot summer season, lumbering swiftly and erratically about the simmering desert floor, ever in search of food, which consisted of leaves and flowers of the prevalent desert annuals. So common is this insect (relatively speaking) in the wide, flat, hot valleys of the Lower Sonoran Zone in Southern Nevada, that I find it a convenient zoologic index to the flora and fauna peculiar to these situations; particularly well does its population climax in Southern Nevada coincide with that of the polemonioid *Langloisia setosissima*, which, in conjunction with *Gilia ophthalmoides*, *G. leptomeria*, and *Glyptopleura setulosa*, locally forms the bulk of its food during early summer.

The familiar *Covillea tridentata*, in whose company *Cysteodemus armatus* has so often been reported, extends northward, unaccompanied in the last reaches of its area by its distinctive little black canfrère. Southward, in the very tip of the state, the insect is intimately associated with *Prosopis juliflora* in the granite-derived and much dissected outwash plain leading down eastward from the Dead Mountains to the Rio Colorado. Here, it lives in the numerous washes, with their concentrated detrital sand and their characteristic floral association of *Prosopis juliflora*, *Cassia armata*, *Krameria canescens*, and *Parosela fremonti*, and bustles about actively, while the mid-day air temperature is 130 degrees and the sand simmers at 150. In such extreme temperatures, *Cysteodemus armatus* loves the shade of dense, rugged shrubs and perennials, and scurries from plant to plant in her excursions.

I had no occasion to observe feeding habits in the Dead Mountains, but considerably farther northwest, in Pahrump Valley, splendid opportunities of the sort presented themselves. Here, in a large, level valley, bounded on the north and east

by the magnificent Spring Mountains, whose Charleston Peak stands up against the sky as a biologic island of unique possibilities, and on the south and west by low, long ranges, I found an environment admirably suited to the desert beetle.

Pahrump Valley itself is flat, unbroken save for a general swell near the northwest portion. A low fault line runs northwest-southeast in the center of the valley, with an approximate offset of one foot and hanging wall of fifteen feet. At Stump Springs, near the northwest end of this fault, Stump Creek, an irregularly periodic stream flowing in a southwest direction from the foothills of Spring Mountain twelve miles away, has cut back a moderate flat-bottomed gully through the two-foot hardpan which caps the valley floor. Here, in the desert at the mouth of the gully, *Cysteodemus armatus* has found an ideal situation, and abounds in relatively large numbers, inseparably associated with *Covillea tridentata*, *Prosopis juliflora*, and the annuals previously mentioned, as well as the ubiquitous *Stanleya elata*, *Eriogonum inflatum*, and many unidentified plants, as *Oenothera*, *Eriogonum*, *Atriplex*, *Chenopodia*, *Asclepias*, etc. *Abronia orbiculata* and *Nama demissa* are abundant on the sand dunes bordering the gully, while *Anemopsis californica* and *Heliotropium xerophilum* are profuse in moist situations about the small pool maintained by a constant, but small, spring at Stump Springs proper.

In this widened area, as well as on the "mesa" about, the beetle can be found at almost any well-lighted, warm time of day. The bulk of individuals seen are females, but during June, at least, pairs in copulation are not uncommon.

In foraging, some individuals hold a remarkably straight "course" between the creosote bushes, maintaining themselves at an average median distance from bordering shrubs with consistency; these jaunts may be for some distance, and are ultimately interrupted by much wandering in a relatively small area, this latter performance as remarkable for its haphazard indefiniteness as the former is for its conciseness. The reason for such wandering is not altogether clear. Occasionally, when male and female met, coition ensued, but more often, the different sexes paid little attention to each other during these haphazard meetings, the male occasionally becoming momentarily excited. Since later observations seemed to show that the search

for food was not primarily responsible for such behavior, the answer is undoubtedly to be found in the egg-laying activities of the animal.

In this area, *Langloisia setosissima* was abundant and seemed a favorite food. Any plant encountered "on the march" was almost invariably fed on.

The manner of locating the plant was interesting, and seemed to be effected almost, if not entirely, by the sense of smell, except at the extremely short distances of one inch or less. On innumerable occasions I have seen a female bustle by a plant not more than four inches away, certainly not beyond the range of even mediocre vision, and be unaware of its existence. That these were not individuals already satiated was shown by the fact that they all encountered a *Langloisia setosissima* sooner or later, and fed upon it without hesitancy. I have in my field-book, data concerning a robust female who bustled "for two hundred feet along the Stump Springs hardpan, going in a straight line and avoiding all bushes, but stopping twice to feed on *Langloisia setosissima*, the last time passing the plant, then scenting it as she drew away down-wind, and returning directly to it, a distance of sixteen inches." This was one of numerous instances.

In feeding, the individual generally climbs upon the plant, and feeds on the choicest tidbits at her leisure; this is invariably the procedure with the higher *Gilia leptomeria* and *G. ophthalmoides*, which cannot be reached from the ground, but is also the general method followed in feeding over the low plants, as *L. setosissima*, in which all but the innermost portions are accessible from the ground.

The act of feeding is of interest: from my fieldbook—"watched a large female feed on leaves and dried flowers of *L. setosissima*. Bites were not clean-cut, but feeding consisted of macerating the tissues to a pulpy mass, then pulling them away from the main portion, sometimes in long threads which were laboriously swallowed. Twice she pulled the sharp-pointed bristles, which adorn the calyx tips and leaves, into her mouth, then rejected them. Once she apparently stuck herself, for she pushed the bristle out with her forelegs and pawed several times at her mouthparts. Defecation proceeded more-or-less continu-

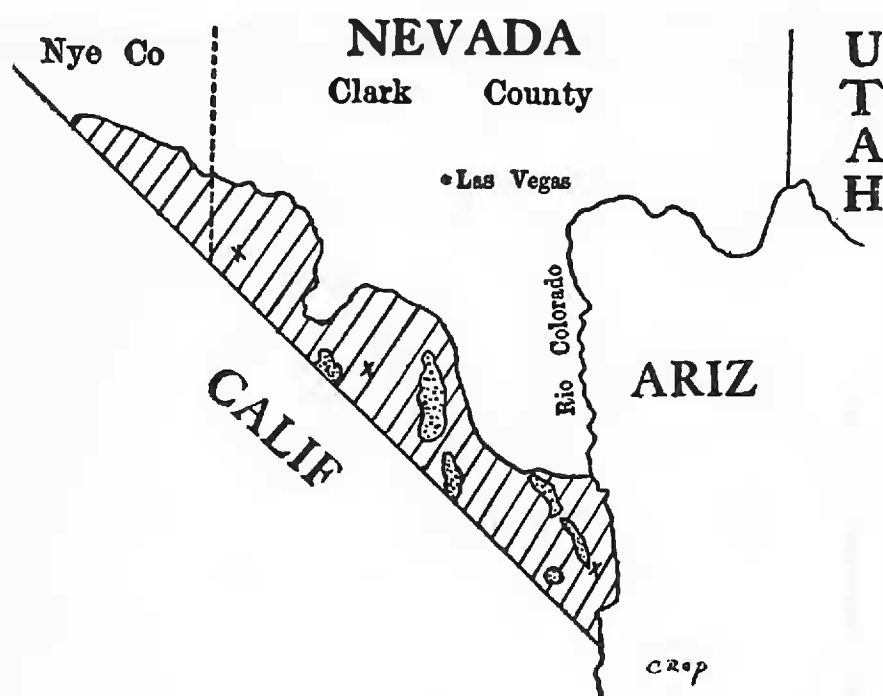
ously throughout the feeding. After eating three leaves and trying a dead flower, she left the plant, described a short, bustling circle, then returned to feed again. She finally left after a total feeding period of eleven minutes."

In copulation, the male rides complacently upon the back of the female, who carries him wherever she goes, even wandering high up in the slim and precarious stems of *Gilia ophthalmoides* with her burden. When a pair are frightened, there is a general attempt at an exodus, but the male, though he tries, can seldom escape, and is dragged off by the more powerful female.

Of the very interesting egg-laying activities, I saw little. In this same region, I came upon a female emerging from a burrow, which immediate excavation showed to be an inch and a half deep, struck obliquely into the ground at a 60 degree angle, and containing a ball of small, elongate, white eggs, the entire mass being 7 mm. in diameter. She had undoubtedly just terminated the long and laborious process of conceiving, nurturing, and depositing the clutch, for the mass was still moist to the touch, and pliable. On four occasions, before and after this, I observed females begin the process of digging a burrow, but watched only to see them desert a job not even well begun, and resume their incessant wandering. What digging they performed was done with mandibles and forelegs, the former loosening the dirt, the latter pushing it backwards beneath the abdomen. For some reason which I have not as yet discovered, but which must be of some moment to *C. armata*, select spots for egg deposition are not easily found, although I was not able to detect any distinct differences in soil texture, compactness, hardness, or location between the various abandoned sites and the burrow which I found, incidentally, beneath a gnarled *Prosopis juliflora* beside a gravel wash.

As its numbers attest, *C. armata* is highly successful in its environment. The fact that it is a beetle, and thereby possessing a heavily chitinized coat, or at least, in remote times, an excellent foundation for such a coat, placed it one jump ahead of the game in its efforts to resist extreme dessication. Its wingless condition, by forcing it into a restricted, ambulatorial "groove," has enabled it to become a master competitor for

the favors of its surroundings because of its consequent ability to expend all its energies upon a single phase of its environment, instead of many.



Map showing the distribution, as near as can be ascertained at present, of *Cysteodemus armatus* in Southern Nevada. The stippled, enclosed areas are mountain ranges within the region inhabited by the beetle, but upon which it does not occur, being strictly a lowland insect. An X marks the localities of exceptional abundance of the species. The insect's altitudinal variation within the limits of this map are from (approximately) 500 ft. to 2500 ft.

NEOTROPICAL GYPONINÆ

In the Annals of the Carnegie Museum, Vol. XXVII, pp. 11-52, 1938, Prof. Herbert Osborn has given us a most valuable paper on the Neotropical Gyponinæ. In this he treats of 70 species which he places in nine genera, with a key to these genera and five plates, mostly of structural details. Of these 3 genera and 38 species are described as new.

One correction seems to be called for. On page 12 he states that he finds no record of genus *Proranus* Spinola having been described. This genus was fully characterized by Spinola in his Tavola Sinottica, p. 122, 1850, with one species *ghilianii* Spinola from Para, which must be taken as the type of the genus.—E. P. Van Duzee.